

*Tennessee.*—2d, 3d, 4th, 12th, 13th.

*Ohio valley.*—2d to 5th, 8th, 10th, 11th, 12th, 21st.

*Lower lake region.*—3d, 5th.

*Upper lake region.*—1st, 2d, 3d, 5th, 9th.

*Upper Mississippi valley.*—1st, 2d, 4th, 5th, 7th, 8th, 15th, 31st.

*Missouri valley.*—2d to 6th, 8th, 31st.

*Northern slope.*—29th.

*Middle slope.*—2d, 5th, 23d, 29th, 31st.

*Southern plateau.*—3d, 9th.

*Middle plateau.*—1st, 2d, 4th, 5th, 15th, 31st.

*Northern plateau.*—1st, 4th.

*North Pacific coast region.*—1st, 7th, 10th.

*Middle Pacific coast region.*—2d, 3d.

#### MIRAGE.

Milwaukee, Wisconsin: from 4 to 5 p. m. of the 29th, Racine Point, twenty miles south on Lake Michigan, was plainly visible on the horizon.

Mirages were also reported from the following stations:

Duluth, Minnesota, 9th.

Galveston, Texas, 10th.

Webster, Dakota, 15th.

College City, California, 20th, 21st.

Kitty Hawk, North Carolina, 23d.

Indianola, Texas, 28th.

#### MISCELLANEOUS PHENOMENA.

The Signal Service observer at Bismarck, Dakota, reports that at 9 p. m., on the 22d, and again at noon of the 23d, several sharp reports, compared to that of a small pistol, caused by the striking of small fragments of stone against the windows, were generally heard throughout the city. The phenomenon was the source of general comment, the cause of it being unknown until the afternoon of the 23d, when numerous pieces of a flinty substance, supposed to have been of meteoric origin, were collected.

The following note in reference to this phenomenon appeared in one of the Bismarck newspapers of May 23:

For several days the people of the city of Bismarck have been wondering what it was that caused the cracking noise against the windows of the stores and houses. \* \* \* By close observance it was ascertained that the substance which occasionally struck against the glass was a meteoric stone. Small pieces were picked up last evening and were found to be fine fragments of stone.

Observers along the Atlantic coast from Rhode Island to New Jersey, report that on the evening of the 2d, the moon appeared to be of a bright red color. This phenomenon was evidently caused by the smoke from the extensive forest fires which prevailed in New Jersey, New York and Pennsylvania for several days preceding that date.

The following stations report having observed the peculiar appearance of the moon above referred to:

Point Judith, Rhode Island: the atmosphere was filled with smoke from 7.30 to 11.30 p. m. of the 2d, during which time the moon appeared to be of a dull red color.

Narragansett Pier, Rhode Island: from 8 to 11.30 p. m., on the 3d (?), during the prevalence of a light haze, the moon appeared to be of a bright red color.

Philadelphia, Pennsylvania: at about 7 p. m. of the 2d, a dense smoke filled the atmosphere through which the moon appeared to be of a blood-red color.

Barnegat City, New Jersey: on the afternoon of the 2d, the atmosphere was filled with a dense smoke, and at night the moon was of a deep orange color.

#### SUNSETS.

The characteristics of the sky as indicative of fair or foul weather for the succeeding twenty-four hours have been observed at all Signal Service stations. Reports from one hundred and fifty-nine stations show 4,864 observations to have been made, of which three were reported doubtful; of the remainder, 4,861, there were 4,069, or 83.7 per cent., followed by the expected weather.

#### SUN SPOTS.

Professor David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for May, 1884:

Date— May, 1884.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 5 p. m.	0	0	1	101	0	0	3	701	
2, 11 a. m.	1	2	0	51	0	0	4	601	
3, 7 a. m.	1	3	1	51	0	0	4	451	
4, 6 p. m.	0	0	1	2	0	0	3	351	
5, 5 p. m.	1	3	1	5	1	3	3	551	
9, 7 a. m.	3	301	0	0	0	0	6	601	
11, 3 p. m.	2	51	0	0	2	51	8	651	
12, 11 a. m.	0	101	0	3	0	0	8	651	
14, 12 m.	1	3	0	0	1	3	8	501	
15, 10 a. m.	1	2	0	101	1	2	8	401	
16, 10 a. m.	0	0	1	101	0	0	6	251	
17, 6 p. m.	1	3	1	51	1	3	6	201	
18, 10 a. m.	1	1	0	0	1	1	7	251	
19, 11 a. m.	0	0	1	2	0	0	6	251	
20, 3 p. m.	0	0	1	1	0	0	5	201	
21, 1 p. m.	1	2	0	51	0	0	6	201	
22, 11 a. m.	3	101	2	2	3	5	7	301	
23, 3 p. m.	3	201	0	0	2	101	10	501	
24, 11 a. m.	0	0	0	0	0	0	10	501	
25, 3 p. m.	0	0	0	0	0	0	10	451	
26, 11 a. m.	1	101	0	0	0	0	11	551	
27, 10 a. m.	0	201	2	101	0	0	9	651	
29, 9 a. m.	1	1	1	3	1	1	7	601	
30, 5 p. m.	2	51	0	0	2	51	9	601	
31, 12 m.	0	0	1	2	0	0	8	501	

Facule were seen at the time of every observation. †Approximated.

New Haven, Connecticut: at 5 p. m. on the 2d, during the prevalence of a dense haze, the sun was of a dark red color, and on its disc was observed a large spot, resembling the "transit of Venus."

Yuma, Arizona: at 6 p. m. of the 14th a large spot was observed on the sun. A light sand storm was prevailing at that time, and through the sand in the air the spot was distinctly seen. The same spot was also seen on the 3d, appearing like the shadow of a planet; it was apparently moving across the sun from east to west, describing an arc of circle. On the 16th the diameter of the spot was about one-thirtieth that of the sun; on the 17th it was nearing the lower edge of the sun; it was visible on the 18th and 19th, but was not observed after the last named date.

#### EARTHQUAKES.

The following extract is taken from "The New York Maritime Register," of May 21, 1884.

On April 21st, when in N. 21° 06', W. 61° 43', the schooner "M. A. Nutter" was shaken from stem to stern by the shock of an earthquake, apparently from the westward.

The following is taken from the "New York Herald" of May 15th.

CONSTANTINOPLE, May 14, 1884.—An earthquake has occurred in the region south of the sea of Marmora. Some damage was done at Panderma and Erdek, in the province of Broussa. Two slight shocks were felt at Balikesir, but no damage was caused.

#### METEORS.

Captain L. J. Stevens, of the schooner "John Bracewell," reported: May 4th, 2.10 a. m., local time, in N. 42° 28', W. 70° 00', saw a very bright meteor, altitude 45°, bearing ne., course about wnw., ending at nw., altitude about 30°.

Dayton, Washington Territory: at 9.15 p. m. of the 13th, an unusually bright meteor was seen passing in a southerly direction. At its disappearance two bright flashes, occurring in rapid succession, were observed; it left a pale white cloud which floated off in a southerly direction. At 1 a. m. on the 16th, a brilliant meteor passed from near the zenith to the horizon; when about midway between those points it exploded into three parts, all of which disappeared beneath the horizon.

Meteors were also observed at the following places:

Somerville, New Jersey, 1st.

Swanwick, Illinois, 3d.

Prairie du Chien, Wisconsin, 7th, 27th.

Red Willow, Nebraska, 9th.

Milan, Tennessee, 9th.

Liberty Hill, Louisiana, 13th.  
 Fort Scott, Kansas, 13th, 21st.  
 Woodstock, Maryland, 15th, 24th.  
 Davenport, Iowa, 17th, 19th, 21st.  
 Manhattan, Kansas, 18th.  
 Bethel, Connecticut, 23d.  
 Lead Hill, Arkansas, 27th.  
 Beloit, Wisconsin, 27th.

#### PRAIRIE AND FOREST FIRES.

Elkton, Cecil county, Maryland: the high winds on the 3d caused the forest fires, which had been burning in this vicinity for several days, to spread rapidly. Several thousand acres of valuable timber land were burned over; fencing and buildings were destroyed.

Washington, Warren county, New Jersey: an extensive fire prevailed in the Blue mountains, about twenty-five miles distant, on the 2d and 3d, and dense clouds of smoke swept over this county. On the afternoon of the 2d this town was enveloped in a suffocating smoke.

Port Jervis, New York: the entire village of Gilman's Depot, in Sullivan county, was burned on the afternoon of the 2d, the fires originating in neighboring forests. It is reported that not more than half a dozen houses were left standing within a radius of five miles in that vicinity; two railroad bridges were also burned. The total loss is estimated at \$100,000.

Kingston, Ulster county, New York: forest fires burned a large quantity of timber in the Catskills on the 3d.

New York City: the atmosphere was filled with smoke on the 3d, caused by the forest fires in the surrounding country. Reports from Middletown, Orange county, on the above date, stated that the Catskill mountains and those north of Shawangunk township, in Ulster county, were on fire. Fires were also burning on Storm King mountain near Cornwall, and in the highlands west of Haverstraw.

On the 25th, forest fires burned over a large tract of land between Setauket and Stonybrook, Long Island.

Petersburg, Virginia: reports from Isle of Wight county on the 3d, stated that destructive forest fires were burning in that county on the above date.

Mount Carmel, Northumberland county, Pennsylvania: much fencing and cordwood were destroyed by the forest fires on the 3d. The fires, which burned over an area of many square miles, are considered the most destructive that have occurred here within the last fifty years.

Reading, Berks county, Pennsylvania: fires prevailed in the Blue mountains along the northern border of this county on the 3d, destroying much valuable timber.

Scranton, Lackawanna county, Pennsylvania: the branch works of the Moosic powder works were destroyed by forest fires on the afternoon of the 1st, resulting in a loss of \$20,000. In one of the buildings destroyed was stored a large quantity of powder and the explosion caused the destruction of the adjoining buildings. At Tobyhanna, Monroe county, the fires burned with great energy, threatening many dwellings and vast timber interests.

Ashland, Schuylkill county, Pennsylvania: great damage was done to forests in this county by the extensive fires which prevailed on the 3d. In Northumberland county the fires destroyed more than 5,000 cords of charcoal and also ignited the Culmbank coal mine at Hill Gap. Reports from Emporium, Cameron county, on the 3d, stated that the forest fires had destroyed a large amount of property. At Sterling run, nine miles from Emporium, several buildings, including a large mill, were burned; at Swissmont, fifteen miles west of Emporium, two mills with a large amount of lumber were destroyed.

Wilkes Barre, Luzerne county, Pennsylvania: forest fires prevailed in this vicinity during the 1st, 2d, and 3d. At California, a lumbering town near White Haven, eleven houses were consumed. Two bridges on the Beaver Creek branch of the Lehigh Valley railroad, together with a large amount of

valuable timber, were also destroyed. The total loss is estimated at \$50,000.

Wellsborough, Tioga county, Pennsylvania: the forest fires in this county, on the 1st, 2d, and 3d, destroyed about one hundred dwellings, together with much valuable timber, entailing a total loss of about \$600,000.

Prairie and forest fires were also reported by the following stations:

Vermilion, Dakota: prairie fires were observed almost daily during the month and noticed every night from 25th to 31st.

Fort Buford, Dakota: 7th, 16th, 19th, 23d, 24th, 25th.

Yankton, Dakota: 7th, 8th, 13th, 14th, 15th, 17th, 18th.

Poplar River, Montana: 9th.

Milton and Rowe, Massachusetts: 4th.

Taunton, Massachusetts: 5th.

Troy, Pennsylvania: 1st.

State College, Pennsylvania, 2d.

Providence, Rhode Island: 2d.

#### WATER SPOUTS.

The "Oswego Palladium" of May 30th publishes the following:

Many residents of Pultneyville, Wayne county, on Lake Ontario, who were looking out upon the lake about 6 o'clock last Thursday (22d?) evening were treated to the sight of an unusual occurrence. It will be remembered that at that time a strong wind was blowing and a slight rain was falling in this section. T. Scott Ledyard, who was looking out upon the lake at the time and was one of the spectators of the scene, states that the sight was one of the most remarkable he has ever witnessed. About five miles from the shore a huge body of water from thirty to forty feet high and over two miles in breadth was seen advancing toward the shore with great rapidity. It grew larger as it advanced, and a deep trough or road was produced by the rising water. Above the great wave was mist, which entirely cut off the view from behind, and made the spectacle grand and impressive to the beholder. Mr. Ledyard states that this great wave moved to within three to four miles of the shore, and had risen to its greatest proportions, when it suddenly subsided; the roar died away, the mist above parted, and soon the heavens were comparatively clear again. He states that those who were fortunate enough to witness this very rare, although terrifying sight, agree that it was one never to be forgotten.—*Lyons Rep.*

The brig "Noord Ster" on May 3d, when in N. 21° 53', W. 55° 37', was struck amidships by a large water spout, which carried away the maintopmast staysail. Charleston, South Carolina: at 7.30 a. m. of the 27th, a water spout was seen off James' island shore; it was apparently seventy-five feet in height; it disappeared when near the "hundred pines."

#### MIGRATION OF BIRDS.

*Geese flying northward.*—Vermilion, Dakota, 3d, 6th; Dudley, Massachusetts, 10th; Clear Creek, Nebraska, 2d; Grand Haven, Michigan, 7th; Albany, Oregon, 21st.

The following extract is taken from the "Saint Paul Pioneer Press" of May 24, 1884:

WINONA, MINN., May 23.—On Tuesday (20th) and Wednesday (21st) nights of this week thousands of migratory birds gathered about the electric light on the standpipe in this city. Between the hours of 1 and 2 o'clock the birds were seen in swarms about the light, and more than one hundred fell to the ground. A few were caught alive, but the larger part were dead. Professor Holzinger, of the Normal school, reports the following species among those collected during the past two nights, through the kind offices of Engineers Bothman and Higgins at the waterworks, viz: Catbirds, grossbeaks in variety, scarlet tanagers, golden-crowned thrushes, water thrushes, chestnut-sided warblers, blackburnian warblers, Tennessee warblers, magnolia warblers, Carolina rails, yellow-throated virees, black and white creepers, Trael's fly-catchers, green-crested fly-catchers, Savannah sparrows, white-throated sparrows, Maryland yellow throats, black-billed cuckoos, hell-drivers, indigo birds, and yellow-bellied woodpeckers. On Tuesday night the grossbeaks predominated and on Wednesday night the rails. Catbirds were numerous on both nights. The birds which breed in this locality were noticeably absent. Valuable additions from these birds are being made to the museum of the Society of Arts and Science, and a set of duplicates of most of the varieties has been furnished by Professor Holzinger to the High school collection. Many of the birds which were caught alive may be seen in cages at the engine house of the water-works.

#### POLAR BANDS.

Lead Hill, Arkansas, 1st, 5th, 26th.

Archer, Florida, 1st, 8th, 12th, 13th, 17th.

Riley, Illinois, 16th, 20th.

Maud, Kansas, 22d.  
 Gardiner, Maine, 6th, 7th, 22d.  
 Vineland, New Jersey, 9th, 12th, 26th.  
 Wauseon, Ohio, 1st, 5th, 6th, 16th, 21st, 30th.  
 Nashville, Tennessee, 30th.  
 El Paso, Texas, 24th.  
 Wytheville, Virginia, 2d, 8th, 15th.  
 Lynchburg, Virginia, 20th.  
 Cape Henry, Virginia, 15th.  
 Yates Centre, Kansas, 20th.

## ZODIACAL LIGHT.

Archer, Florida, 13th, 22d.  
 Humboldt, Iowa, 10th, 26th.  
 Cambridge, Massachusetts, 12th, 14th.  
 Escanaba, Michigan, 11th.  
 Nashville, Tennessee, 15th, 16th, 17th, 19th, 20th.

## DROUGHT.

Havana, Mason county, Illinois, 30th: the crops in this vicinity are suffering in consequence of drought.

Milledgeville, Baldwin county, Georgia, 31st: crops are beginning to suffer from lack of rain.

## INSECTS.

Professor C. G. Boerner, of Vevay, Switzerland county, Indiana, reports that during May, "insects injurious to vegetation, prevailed to an alarming extent, currants, gooseberries, roses, and grapevines, suffering especially from their ravages."

## SAND STORMS.

Fort Thomas, Arizona, 2d.  
 Yuma, Arizona, 13th, 14th, 18th, 25th.  
 Fort McDowell, Arizona, 8th.

## NOTES AND EXTRACTS.

## REPORT OF THE OHIO METEOROLOGICAL BUREAU, MAY, 1884.

The means of the barometer readings, taken at the several stations during the month, show nothing unusual in the matter of atmospheric pressure. On the whole the pressure was slightly lower than for May, 1883, and the range was also somewhat less. The mean temperature for the month was 60° 7, which differs by only three-tenths of one degree from what may be considered the normal mean for May, although it is nearly three degrees higher than the mean for last year. The highest point reached during the month was 90°, at Waverly on the 22d, which is one degree higher than the maximum for May of last year. The minimum was also higher, and the range was almost exactly the same. The maximum daily range of temperature was not as great this year as last. The number of "clear days" was greater, and altogether the weather was more nearly "fair."

The mean rainfall was very nearly "normal," being 3.87 inches, while for May of last year it was 5.72 inches.

Tornadoes are reported from Licking county, Fayette county, and Morgan county. The latter appears to have been somewhat destructive at McConnellsville, where it is reported as having unroofed several houses, blown down many trees, etc. Considerable damage was done at a point two or three miles northeast of the town, where many large trees were blown down. The path of the tornado was not over one hundred feet wide, and it came from the wsw. Frost is reported from the same county on the 29th and 30th, doing but little damage, however.

A violent hail-storm is reported at Marietta on the 13th. The belt through which the storm passed was narrow, but the hail-stones were of unusual size, and in some cases the damage was considerable.

A self-registering anemometer has recently been put in operation at the central office at the Ohio State University. It has been running since 8.15 a. m., May 16. From that date to the end of the month, 3,861.5 miles of wind were recorded, being at the rate of 246 miles per day, or a little more than ten miles per hour. The maximum in one day was 402 miles, from noon of May 22 to noon of the 23d. The minimum was 161 miles, from noon of the 24th to noon of the 25th.

## STATE SUMMARY OF REPORTS FOR MAY.

Mean barometer, 29.957 inches.  
 Highest barometer, 30.376 inches on the 29th at Wauseon.  
 Lowest barometer, 29.517 inches on the 19th at Toledo.  
 Range of barometer, .859 inch.  
 Mean relative humidity, 72.7 per cent.  
 Mean temperature, 60° 4.  
 Highest temperature, 90° 0 on the 22d at Waverly.  
 Lowest temperature, 28° 5 on the 29th at Junction.  
 Range of temperature, 61° 5.  
 Mean daily range of temperature, 22° 2.

Greatest daily range of temperature, 42° 0 on the 22d at Ironton.  
 Least daily range of temperature, 5° 1 on the 27th at Cincinnati.  
 Number of clear days, 10.7.  
 Number of fair days, 11.4.  
 Number of cloudy days, 8.9.  
 Number of days on which rain fell, 13.0.  
 Mean rainfall, 3.87 inches.  
 Average daily rainfall, .125 inch.  
 Greatest rainfall, 6.27 inches at Sidney.  
 Least rainfall, 1.76 inches at Warren.

T. C. MENDENHALL, *Director*.

The following extracts are taken from the May report of the "Tennessee Weather Service," under direction of Hon. A. J. McWhirter, Commissioner of Agriculture:

The meteorological conditions of May were characterized by generally low temperature about the 15th, with heavy rain storms and severe electrical disturbances at intervals during the month.

The mean temperature for the month was 66° 42, or 10° 85 above that of April and 1° 92 above that of May, 1883. The mean maximum temperature was 86°, which was 2° above the mean of May, 1883; and the mean minimum was 48°, or 8° above the mean of May, 1883.

The average precipitation for the month was 3.58 inches, 1.37 inches less than that of April, and .29 inch less than the average for May, 1883. The days of the greatest rainfall were the 2d, 3d, 4th, 5th, 13th, 22d, and 25th. The greatest fall occurred on the 4th, the average for that day being .684 inch; the next greatest was on the day following, the average being .436 inch. These rains in the early part of the month were reported very heavy in the western division of the state, and were quite destructive to the young crops, also damaging the lands to a great extent by washing out of soil.

## STATE SUMMARY.

Mean temperature, 66° 42.  
 Highest temperature, 90°, on the 22d, at Hurricane Switch.  
 Lowest temperature, 39°, on the 31st, at Kingston Springs.  
 Range of temperature, 51°.  
 Greatest daily range of temperature, 41°, on the 31st, at Kingston Springs.  
 Least daily range of temperature, 1°, on the 8th, at Greenville; on the 25th, at Beech Grove; and on the 26th, at Alexandria.  
 Mean depth of rainfall, 3.58 inches.  
 Mean daily rainfall, .115 inch.  
 Greatest depth of rainfall, 8.64 inches, at Trenton.  
 Least depth of rainfall, 1.09 inches, at Waverly.  
 Average number of clear days, 10.3.  
 Average number of fair days, 11.2.  
 Average number of cloudy days, 9.5.  
 Average number of days on which rain fell, 7.3.  
 Prevailing direction of wind, southwest.

## REPORT OF THE ALABAMA WEATHER SERVICE, UNDER DIRECTION OF PROFESSOR P. H. MELL, JR.

## AGRICULTURAL AND MECHANICAL COLLEGE, AUBURN, ALABAMA, June, 1st, 1884.

The reputation for droughts earned by May in past years has in no respect been lost by the month just closed. The atmosphere has been dry and vegetation has suffered. Only three stations report over three inches of rain and four report a fall of less than one inch. The average rainfall for the state falls below two inches.

From the 1st to the 5th it was warm with very light showers. The wind during this time was generally from the southwest. From the 5th to the 18th a cool wave passed over the state with the wind blowing from the west and northwest. After the 18th, and until the 25th, there was an increase in the temperature, with the wind from the south and southwest; and the remainder of the month the wind veered around to the north and northeast, with falling temperature.

Although the month has been dry and parching, yet the thrifty farmers of the state have taken advantage of such conditions of the atmosphere to clean out their crops thoroughly and prepare them to receive profitably the refreshing rains of June.

The observers generally report no phenomena of special interest. From Trinity the following data have been received: "There have been no storms during this month. Very little rain has fallen, though it was cloudy with light showers. The weather has been remarkably cool for the season, and vegetation is very backward. Crops are at least one month late. The dry, cool weather during the latter portions of the month has injured oats, and perhaps cut off that crop almost entirely in this section. Not more than one-half inch of rain has fallen during this month at this point. Fruit prospects are good."

The observer at Tusculumbia reports the weather so cool the 14th, and again during the last week of the month, that fires were comfortable.

## SUMMARY.

Mean temperature, 74° 3.  
 Highest temperature, 98° at Calera on the 22d.  
 Lowest temperature, 41° at Birmingham on the 30th.  
 Range of temperature, 57°.